DOCUMENT RESUME

ED 332 679 IR 014 996

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TITLE Distance Education and Developing Countries.
PUB DATE Nov 90
NOTE 12p.; Section Keynote Address. In: Croft, Marian, Ed.; And Others. Distance Education: Development and Access. Proceedings of the 15th World Congress of the International Council for Distance Education (15th, Caracas, Venezuela, November 4-10, 1990).
PUB TYPE Information Analyses (070) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Developing Nations; *Distance Education; *Educational Development; Elementary Secondary Education; Foreign Countries; Models; Open Enrollment; Open Universities; Organizational Development; Postsecondary Education; Program Development; Secondary Education
IDENTIFIERS Commonwealth of Learning

ABSTRACT

The purpose of this paper is to give those who work in distance education a better awareness of the factors at work in developing nations and to help those whose profession is national development gain a fuller understanding of distance education. It begins with a discussion of the process of national development which focuses on the factors that are involved in such development and the role that education plays in development. A World Bank study of educational effectiveness in Africa is reviewed, highlighting areas where distance education promotes development and where it is counterproductive. Canadian policies are described as they contribute to the development of human resources, programs, and distance education systems. Distance education is then examined against the backdrop of the principles and practice of development, and the distinction between distance education and open learning is clarified. Institutional requirements of distance education are compared to military logistics, and the evolution of organizational structures for the conduct of distance education are discussed. It is noted that distance education is not linked to a particular level of education, to specific technologies, nor to a standard organizational set-up. The paper concludes with a description of the Commonwealth of Learning, an attempt by member countries of the Commonwealth to help each other apply distance education to the challenges of human resource development. (references) (DB)

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ED332679

Distance Education and Developing Countries

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Keynote Address
World Congress of the International Council for Distance Education
(15th, Caracas, Venezuela, November 4-10, 1990).

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KEYNOTE ADDRESS

Distance Education and Developing Countries

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It is often assumed that distance education can be a useful component of development policy. The assumption is true. At present, however, most successful applications of distance education are in industrialized countries, newly industrialized countries, and one or two very large developing countries such as China and India. Distance education has not yet had much impact on the many small countries that make up most of the national units of the developing world.

Part of the reason is that the partners in the potentially fruitful marriage between distance education and the development process simply do not know each other well. Those involved in distance education are often not well informed about the dynamics of the development process. They assume that development is a linear progress in which any increase in educational activity is a good thing. The only challenge, if one starts from this perspective, is to show where distance methods can do a better job than conventional approaches to education.

However, development specialists, who would consider this view naive, often have only a partial understanding of the range of approaches and objectives that distance education can embrace. They tend to assess the usefulness of distance education by generalizing from one or two examples with which they are familiar. If these examples depend on sophisticated technology, or are aimed at the university level, development specialists will be sceptical of any relevance of distance education to poor, small countries.

The purpose of this paper is to give those who work in distance education a better awareness of the factors at work in development and to help those whose profession is national development gain a fuller understanding of distance education. It is intended to facilitate more productive communication between what have been, unfortunately, two solitudes.

We begin with statistics to show that most developing nations are small, often island, states. Next we summarize the evolution of thinking about the development process to show that the relation between education and development is not simple. Taking the example of Sub-Saharan Africa, which includes many of the world's poorest countries, we review a World Bank study that assessed the effectiveness of educational development in the region over the last two decades. This review highlights areas where distance education is likely to promote development, as well as those where it may be counterproductive. This section on development concludes with a summary of some of the special features of small states.

The paper then examines distance education against the background of the principles and practice of development. Written with the development professional in mind, it clarifies the common confusion between distance education and open learning by looking at the objectives implied in these terms. It then explores the institutional requirements of distance education by analogy with military logistics and provides an account of how organizational structures for the conduct of distance education have evolved and continue to do so. The aim is to show that distance education is not linked to a particular level of education, to specific technologies, nor to a standard organizational set-up.

We conclude the paper with a description of the thinking behind the Commonwealth of Learning, which is an attempt by the member countries of the Commonwealth to help each other apply distance education to the challenges of human resource development.

The Process of Development

The Developing World: A Majority of Small States

Data assembled by Brock (Commonwealth Secretariat, 1984) show that most of the world's national units are small in surface area (52 percent less than 100,000 sq. km); most do not have large populations (54 percent less than 5 million); and most are poor (55 percent with a GNP per capita of less than $US 1,000 in the late 1970s). The 49 member states of the Commonwealth, for example, include 27 countries with populations of less than 2 million. There are also in the Commonwealth a further 18 associated states and dependent territories all of which, with the exception of Hong Kong, have small populations. These countries, states, and territories all face the challenge of using education wisely in their development.

What is Development?

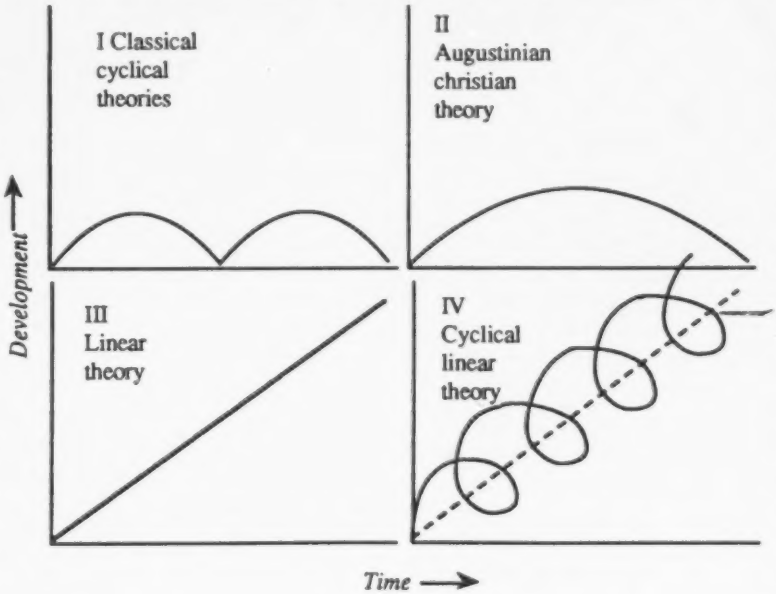
The idea of the development of a nation is broad and ambiguous. It embraces a number of processes described by terms like growth, social change, advancement, progress and modernization which are heavily value-laden. The study of development is not new, although it has acquired greater urgency in the last 50 years—first as countries rebuilt after World War II, and then as a host of newly independent countries tried to define and pursue their national destiny. Indeed, the notion of destiny may help us toward a value-free concept of development.

In their excellent study of the relationships between edu-

cation and development Fägerlind and Saha (1983, 4) quote Fletcher (1976) to the effect that development "can mean the actualization of an implicit personality, the simplest example being the patterned maturation and growth of a seed, or an initial germ cell, to the full adult form of the individual plant or animal or human person." This process, said Fletcher, can apply to humankind and its social structures.

This analogy implies that development occurs over time and in cycles. Noone has seen the birth or death of a civilization, but both do occur. Fägerland and Saha trace the history of the notion of development cycles through four stages. First was the Greek and Roman belief in recurrent cycles of growth and decay, echoed later by the Islamic thinker Ibn Khaldun, who emphasized never-ending conflict as a reason for such cycles. Second, in the Christian era, Augustine presented development as a single major cycle culminating in the end of the material world. Later, in the optimistic atmosphere of the Enlightenment, the idea of a cycle or cycles gave way to a belief in continuous progress. This third view of development was then reinforced by evolutionary theories based on a faith in mankind and the expectation that all societies develop through similar stages. Most recently, partly in response to the many events in this century that have made a belief in steady, continuous progress untenable, the linear and cyclical theories have been combined to give a spiral model of development. These four models are represented diagrammatically in Figure 1.

Models of development: schematic representation



Among the important contemporary theories of development the spiral model embraces the liberation theory in particular. This holds that radical change is needed before good can come to the poorer members of a less-developed society. In the words of liberation theorist Paolo Freire: "I interpret the revolutionary process as dialogical cultural action which is prolonged in cultural revolution once power is taken." (Freire, 1972,158).

This summary of models of development shows that most often it has not been seen as a linear process. The assumption that more education will produce more progress, *ad infinitum*, with the industrialized countries playing a benign, helping role, is far too simple. Indeed, the views on development that are grouped under the label of dependency theory argue that underdevelopment is actually caused by the richer countries on which poorer countries depend. The thinkers of this school deprecate particularly the role played by the elites in poor countries, called by Frank (1972) the "Lumpen bourgeoisie, "whose values, views, and interests correspond to those of the rich countries. But how these elites can be induced to ignore their own advantage in favor of the advancement of the population as a whole is not clear. Another weakness of dependency theory, according to Fägerlind and Saha (1983, 24) is that it does not square easily with any form of international co-operation for development, though the evidence shows that such co-operation can be helpful, at least in the short run.

The diversity of views on the nature of underdevelopment is reflected in judgments made on the role of education in development. To discuss this role in the context of a more operational definition of the desirable changes that are usually recognized as development, we list three criteria proposed by Furtado (1977).

First, there is an economic dimension requiring that the efficiency of the country's production system be increased. Second, there is an ideological dimension that calls for the benefits of economic progress to be distributed so as to raise the quality of life for the population as a whole. Third, there is a political dimension which requires the various groups that make up society to have the opportunity to participate in decision-making and so influence the use and distribution of scarce resources.

What is the Role of Education?

We might expect education to have a favourable impact on all three of these dimensions of development. This optimistic expectation fired the enthusiasm for investment in education characteristic of the 1960s and early 1970s. Some

countries were then spending almost one-third of their national budgets on education, confident in the assumptions that an educated population would contribute to the socio-economic development of society as a whole and that education would also increase individual well-being.

Development agencies now look back on that era as the age of innocence. The 1980s have been an age of scepticism, influenced by conclusions such as that of Weiler (1978, 180): "Educational expansion, as we now know, does not necessarily make either people or countries more prosperous: instead it may, and does, leave the former without jobs and the latter with increasingly burdensome claims on public funds." By understanding the basis of both innocent and sceptical views of the role of education in development, we may be able to make the 1990s an era of realism.

We noted that the most optimistic views of the role of education date back to the Enlightenment and the belief of thinkers of that time that the improvement of the human mind would drive the advancement of humankind. Through education, accompanied by the pursuit of knowledge, the common heritage of humanity could be enhanced, as well as transmitted, between one generation and another.

The awareness that writing and calculation were essential foundations of civilization came well before the Enlightenment. Both the Greeks and the Romans wanted their children to be able to read and write. Education in classical times also reflected the need of "civilizational states," made up by the union of smaller local units, to replace regional loyalties with loyalties to the state, at least among the elite. For Plato, the good student was also the obedient subject. The same is true of modern nations. Today's industrialized states simply require a much larger proportion of the population to share the common values that education can inculcate.

The combination of these views is most evident in the approach to education of the socialist states, which attach high importance to literacy and also need a way of creating loyalty to Marxist values.

But this does not mean that education has been seen as the key to economic growth and social change ever since the Enlightenment. The only example of a policy of development through education that predates the present century appears to be that of Japan, which industrialized in the late nineteenth century having already introduced universal education in 1872. According to Fägerlind and Saha (1983, 38), even by 1850, 40 percent of the male population of Japan was literate.

In this respect, Japan was unique. In Britain, by contrast, the industrial revolution caused an increase in the provision of schooling, not the other way round. Indeed, the desirability of expanding education was hotly debated, some fearing it would create a less compliant labor force. It seems that social change drives educational change. Marxist thinkers therefore argue that education has the conservative effect of maintaining the status quo in the stratification of society. It may promote economic growth, but it does not promote equality. For such thinkers, traditional education is so rooted in capitalist values that the "Lumpen bourgeoisie" in developing states simply perpetuates the old dependencies. However, it does not appear that countries which have chosen the socialist path have freed themselves from these problems, either.

It was the rising costs of education that sowed more widespread doubts about the link between education and development in the late 1970s. Education was already taking a large slice of the budgets of many poor countries and a further increase in its share would be at the expense of other, possibly more vital, investments. This happened at a time when the effects of the oil shocks and a downturn in the world economy were providing brutal reminders of global interdependency, and there was a shortage of employment for newly educated young people.

At the University of Mauritius, to cite just one example, 1979 saw strident student protests about the lack of jobs for graduates. And this was at a university that had tried harder than any in the African region to match its programs to the country's economy and its student intake to the capacity of the labor market.

In industrialized and developing countries alike there was an agonized reappraisal of the relationship between education and economic development.

The Effectiveness of Education in Development

For the industrialized countries, the OECD conducted studies in the early 1980s with the aim of discovering which types of educational expenditure or practice correlated best with strong economic performance (for a summary, see *The Economist*, Dec. 20, 1986 p. 97). Four measures of education and training appeared to have particularly strong links with economic growth:

- The proportion of young people staying in full•time education beyond age 16, and how long they do so;
- The proportion of working adults between 25 and 35 involved in part•time post•secondary education to improve their skills;
- The investment of companies in training;
- The part-time release of young workers by employers for educational purposes.

Distance educators unfamiliar with the development literature wrongly assume that the results of studies like this, carried out within the world's 24 richest nations, can be extrapolated readily to developing nations. This assumption leads, for example, to recommendations that the creation of distance education universities should be a high priority for developing countries. The reasoning is that such institutions can serve both young full-time students (as in Korea and China) and adult workers (as in the U.K. and Canada). Of course, distance education universities could serve these

groups, but recommending their establishment may ignore the greater needs of developing countries in other areas.

For the developing countries, the nearest equivalent to the OECD reports on education and economic performance is a World Bank policy study on *Education in Sub-Saharan Africa* (World Bank, 1988). This hard-hitting review acknowledges the tremendous growth in education in Africa in the post-independence era. Between 1960 and 1983, primary enrolment rates increased from 36 percent to 75 percent. At the tertiary level, student numbers increased from 21,000 to 437,000 over the same period. Clearly, an enormous effort has been made in quantitative terms. The average educational attainment of African people of working age in the median country had gone from less than half a year in 1960 to more than three years by the early 1980s, with a parallel increase in literacy rates from 9 percent to 42 percent.

However, though applauding what has been achieved, the World Bank study does not recommend that Africa simply continue with more of the same. It finds that enrolments are now stagnating and quality is declining; "policies for adjustment, revitalization and selective expansion" are needed. The adjustments are primarily financial. There must be higher user fees, especially at the tertiary level where expenditures per student are a far higher multiple of GNP per capita than in industrialized countries. Non-governmental providers of education should be encouraged. Costs should be contained by using teachers better, building cheaper schools, and reducing drop-out.

The thrust of revitalization, according to the World Bank study, should be to restore the quality of the existing education systems by reaffirming fundamentals. This would include strengthening examination systems, improving the mix of inputs to give more textbooks and learning materials, and increasing the use of capital assets through better maintenance.

The recommendations for the expansion of African education provide the starkest contrast with the priorities of the OECD countries. For the World Bank, Africa's key aim should be renewed progress toward universal primary education, recognizing that this may require investment in child health as well as in education per se. Expansion at the secondary and tertiary levels should be much more selective and should "consider alternative ways of delivering educational services that shift more of the burden for learning onto the students themselves."

When resources are as scarce as they are in Africa, those preparing development policies must be tough-minded about both ends and means. Some levels and fields of education are more important for a society than others. Some methods of providing education are more efficient than others. For example, primary education is of top importance, but—perhaps for this reason—striving for quantity in primary enrolments has caused deterioration in quality. The best way to restore quality is to provide more books and supplies, which are underfunded relative to teachers' salaries. Other quality-promoting recommendations of the World Bank study for the primary level are school feeding and health programs, greater use of radio, in-service training of teachers in subject matter (not pedagogy), and tighter inspection and supervision. The study also singles out some investments *not* likely to improve quality: reducing class size between 25 and 50; giving teachers more than a general secondary education; constructing high-quality buildings; and introducing televisions or computers into classrooms. The need to expand primary education by 3 percent annually just to keep up with population growth is a constant incentive not to waste money.

At the secondary level, costs are higher than necessary because of an emphasis on boarding schools in urban centres. Smaller, community-based schools would cost less and remedy inequalities in school participation, especially for girls. The greatest economies, however, could be achieved by using correspondence and radio-based distance education to reduce, but not eliminate, face-to-face interaction between teachers and pupils. The World Bank study encourages governments to emphasize general mathematical and science skills in the secondary curriculum rather than training for specific jobs and occupations, which is better done by employers.

The study has harsh criticism of tertiary education in Africa despite the impressive enrolment growth it has achieved. There are too many graduates from programs of dubious quality and relevance. Too little attention is paid to generating useful knowledge and development support. Costs are needlessly high because of chronic overstaffing. The financing of higher education is "socially inequitable and economically inefficient." Therefore the need is to improve quality and efficiency, to change the balance of programs and to make the beneficiaries of tertiary education and their families pay more for it,

At the time the World Bank conducted its study, in the early 1980s, the targeting of international aid to African education did not reflect the priorities summarized in the preceding paragraphs. Thirty-four percent of this aid went to tertiary education and only 7 percent to primary education. Only 11 percent of the aid supported operational costs, such as the supplies and materials needed to enhance the quality of the educational enterprise. Yet only quality will ensure that the labor-market return on investment in education is comparable to, or higher than, rates of return in other sectors.

Despite its criticisms of any features of the current educational scene in Africa, the World Bank study concludes that the case for revitalization and expansion of schooling and training is strong, even at a time of scarcity. As well as the micro-economic findings of education's good returns, there are other benefits. Educated people have fewer and healthier children. African countries need educated leaders for

the task of nation-building in a changing world. Above all, concludes the World Bank study, "education is a basic right, an end in itself, an intrinsic part of life and development." (World Bank, 1988,7).

From Studies to Policies

The studies whose conclusions were summarized in the previous section were carried out to facilitate policymaking about education in the rich OECD countries and the developing countries of Africa, respectively. Policymaking is a difficult process since policies must usually reflect local political realities as well as the results of evaluation and analysis. We noted, for example, that the international aid policies of the industrialized countries did not, at least until the early 1980s, reflect the appropriate priorities for developing countries as the World Bank's experts now perceive them. This mismatch was likely the result of a combination of factors. First, the donor countries did not have the benefit of the analyses of the effectiveness of educational expenditures that have now been conducted. Second, in the absence of such information the donors tended to extrapolate from their own situations, leading to an over-emphasis on higher education and capital investment. Third, the local constituency supporting aid programs in the donor countries included influential representatives of universities and of companies with interests in capital projects.

Donor Country Policies: the Example of Canada

As an example of how policies toward development aid have now changed in the industrialized countries, the example of Canada is instructive. In 1987, Canada made its policies on international development assistance explicit in a document entitled *Sharing Our Future* (Canadian International Development Agency, 1987). Four key principles were emphasized:

- Putting poverty first. The need to increase access to learning and ensure equity in participation for disadvantaged groups, especially women.
- Helping people help themselves. This means building indigenous, sustainable capacities in education and training.
- Development priorities must prevail. Activities in education and training must be relevant to local needs.
- Partnership. The appropriateness of education and training is more likely when countries play the lead role in managing their own development.

Against the background of these principles, human resource development (HRD) is now Canada's central priority. It has doubled its aid spending for HRD and decentralized the administration of its HRD activities to the developing countries concerned.

In its HRD interventions, Canada places particular emphasis on sustainability. This means reinforcing the capacity of countries to plan, implement, and evaluate their own HRD systems since they will be responsible, ultimately, for keeping them going. Another important emphasis is access. In singling out the participation of women in education and training as a special priority, Canada is not just reflecting the liberal, Western views of Canadians on gender equality; it is also recognizing that women may have the more important influence on the success of development projects in other sectors, such as agriculture.

It is in this context that Canada requires that distance education techniques, institutions, and systems be analyzed and tested for sustainability and appropriateness for each individual situation, to ensure their cost-effectiveness in overcoming obstacles and bottlenecks caused by limitations of infrastructure and personnel.

These Canadian aid policies, like the conclusions of the World Bank study, place a new emphasis on policymaking and priority-setting in the developing countries themselves. We noted earlier than many of these countries are small in surface area and/or population. Our remarks about policymaking in the developing world will be limited to some comments about the special problems facing small states.

Policymaking in Small States

During the 1980s, the Commonwealth paid particular attention to education in small states. A study by Brock (Commonwealth Secretariat, 1984) pointed out that in small states educational policies "present few features to distinguish them from the policies of much larger countries. ...it is hardly surprising that the problems that beset much larger countries, such as overqualification for jobs and the brain drain, assume such greater proportions in these island states" (p. 54). The study noted that manpower planning also adhered to the specializations of larger societies (urged and abetted by the professions), and that small states are unduly wedded to traditional means of education. This report, as well as the account of a Commonwealth experts' meeting held in Mauritius after its publication (Commonwealth Secretariat, 1986), held out great hope that distance education could help small states to break down the isolationist potential of formal education and reduce their expenditure on the education of their nationals overseas.

Despite such reports, policymakers in small states are often sceptical of the relevance of distance education to their countries for reasons related to both ends and means. First, the term *distance education* is misleading about its purpose. What can distance education do for an island state that has no distances? The term *open learning* is not helpful either. Apart from the intellectual sloppiness involved in using the descriptors distance education and open learning interchangeably (Rumble, 1989), open learning is not an appealing term to an educational official who runs a very closed learning system based on selection by examination. Officials may accept the need to increase access to education while

still resisting the looseness and lack of rigor that they detect, wrongly perhaps, in the expression open learning.

Second, the examination of the institutional vehicles for distance education appears to throw up further obstacles. Those distance institutions that have received the widest and most favorable press have been the large, autonomous institutions such as the open universities of Britain, Thailand, and India. Policymakers of small states may have legitimate doubts about the appropriateness, let alone the affordability, of such institutions in their own circumstances.

These questions about the ends and means of distance education in small states are the hinge between the two parts of this paper. Having explored current thinking about development for the benefit of those involved in distance education, we shall now sketch the principal features of distance education that are of interest to those whose primary concern is development.

Distance Education

What is Distance Education?

The term *distance education* refers to forms of instruction in which classroom sessions are not the primary means of communication.

Classrooms are convenient and flexible vehicles for education because they allow individual instructors to plan, control, and evaluate teaching and learning. Both instructor and student can quickly detect any difficulties in understanding and take steps to overcome them. However, classroom education also has its disadvantages. It makes education a labor-intensive cottage industry dependent on the availability of teachers wherever classes are to be held. It may also make students dependent on this form of instruction so that they have difficulty learning on their own, an essential skill in today's world. For these reasons, nearly all classroom-based teaching includes some independent study, whether it be the short homework assignments given to elementary school children or the more considerable library work required of university students.

Distance education places greater emphasis on independent study at all levels, although it does not necessarily eliminate entirely the face-to-face component of education. However, it does represent a distinct difference in approach, not only from the learner's perspective but also from that of the institution. Whereas in conventional education the teacher teaches, in distance education the institution teaches. Courses of instruction take on a life that is independent of any particular teacher. The essential challenge of distance education is to set up institutional processes to carry out on a larger scale the functions of instructional planning, delivery, and assessment that the classroom teacher is able to perform on a small scale in such a flexible manner. Conventional students, together in class, are in an environment that the teacher controls. Distance education students, on the other hand, are not in an environment that the institution controls. However well the institution organizes the teaching process, it will still have to rely on the student to set aside time for learning and to follow instructions without being able to get immediate answers to questions. Distance education is mostly homework, with occasional work in class; conventional education is mostly classwork with occasional work at home.

Some confusion has been created by the tendency to use the terms *distance education* and *open learning* interchangeably. This tendency grew from an understandable desire to identify new institutions with the overall purpose for which they were established rather than the instructional means they intended to use. Thus, in the most famous example, what had been called the University of the Air in a political speech by British opposition leader Harold Wilson in 1963 became the Open University by the time his government established the institution in 1969. Since then, unfortunately, the term open learning has been used and misused in connection with many distance education initiatives. Rumble (1989) has performed a service by clarifying terms and recommending appropriate uses. Since misuse of the term open learning militates against the adoption of distance education methods by developing countries terminology merits a brief discussion here.

When is Distance Education Open Learning (or Vice Versa)?

To call an educational offering "open" is to contrast it to one that is closed. However, education can be open or closed in many quite different ways. The term open learning is confusing unless the context indicates the dimension of openness that is to be understood.

The British Open University, for example, claims to be open as to people. It has eliminated the academic prerequisites for entry required by other UK universities. To British eyes, this makes it very open. The OU does not, however, have the resources to accept all comers so it admits students through a computer lottery. This makes the institution only half-open in the view of North Americans, who are used to completely open access for mature, part-time students. The new Open Learning Institute of Hong Kong, which received 63,000 applications for less that 5,000 places in its first session, is also only partially open, although it, too, admits by lottery.

The OU is also open as to places. People can study as well in a lighthouse off the Shetland Islands as in central London. However, the possibility of studying with the OU outside Britain is much more limited.

Openness as to methods is another feature of the Open University that distinguishes it from other UK institutions although, like all distance teaching universities, its use of instructional media shows a considerable regularity of pattern from course to course. It is also true that, in the 20 years since the OU was created, conventional universities

have diversified their own instructional methods to use computers, video, and programmed instruction.

The OU did not claim to be open as to curriculum although it did introduce the first credit system to Britain and gave students the opportunity to include a wider range of subjects in their degree programs than other universities. It also introduced a novel continuing education program to British higher education.

These comments on openness are in no way intended to diminish the impressive achievements of the Open University, but simply to demonstrate that the adjective "open" is both multi-dimensional and highly relative.

In some countries, *open schools* are those where the internal walls within the building have been removed to create a large space shared by several classes. In other countries, an open school is one that teaches at a distance.

Although some ambiguity in institutional names is inevitable, it is not appropriate to use open learning as a general synonym for distance education. This is especially true in developing countries, where distance education is likely to be used for teaching conventional curricula and may have to place restrictions on entry for lack of resources.

Distance education institutions vary widely in size and purpose but share common organizational characteristics that distinguish them from classroom-teaching institutions. These organizational characteristics of distance education projects are of special interest to development professionals since local institution strengthening is now an important objective of international aid.

Distance Education: Analogies with Military Logistics

A useful approach to understanding the institutional requirements of distance education is by analogy with the military field of logistics. In making war, logistics is the creation and sustained support of weapons and forces to be tactically employed to attain strategic objectives (Eccles, 1965). Every element of this definition has a parallel in distance education. It could be paraphrased as follows: in educating at a distance, the institutional task is the creation and sustained support of teaching materials and tutorial systems that allow students to progress through incremental units toward an overall educational goal.

Military logistics has to bridge a gap between alien spheres of activity. It has to make the needs of the military commander intelligible to civilian producers of matériel and to put into the military strategist's mind the idea of what is materially possible. It may be an exaggeration to call the production and support of distance education materials "alien spheres of activity." However, the individual and institutional behaviour required by conventional classroom education has created ingrained habits that are difficult to shake. Both the production of course materials and the organization of tutorial support are radically different functions from classroom teaching. It is useful to pursue the logistic analogy further, to identify the functions that must be carried out in distance education and some basic operating principles. There are three elements in military logistics: determination of requirements; procurement; and distribution. The determination of requirements for military hardware often generates conflict between the armed forces and the civil powers. The civilians say the treasury cannot afford what the military claims it needs. A political mechanism has to be found to balance what the country can afford against the risks the country is willing to run.

In distance education there are two aspects to the determination of requirements: curriculum, and instructional format.

For most distance education projects, the curriculum framework is externally determined. It may be the country's secondary school curriculum, the traditional requirements for degree programs or the competencies required to tune an automobile engine. In each case, distance education may employ new instructional methods, but the performance standards the students must meet reflect the requirements of the educational and training systems of the wider society.

This does not mean that distance education is without opportunity to innovate in curricular matters. The creation of a distance education program often obliges a country to address problems of credit transfer between institutions with a new urgency. As the international exchange of course materials accelerates, the challenge of matching credit systems and curricula across frontiers will be felt by distance education establishments with special acuity.

In determining the requirements of instructional format, distance education meets the dilemma encountered in military equipment programs. What might seem pedagogically desirable may be unaffordable. Furthermore, each country's communications infrastructure will likely impose certain media on the project or exclude them from consideration. Thus broadcast TV was available to the Open University in Britain but not to its counterparts in many other countries.

The two other elements of military logistics, procurement and distribution, lead to the rather useful distinction for distance education between producer logistics and consumer logistics.

Logistics of Production and Consumption

Conventional and distance teaching institutions look different. One has classroom buildings that are either busy or empty depending on the time of year. The other looks like a hybrid between an insurance company office and a light manufacturing plant. It has a steady level of activity year-round. For its production function, the distance education institution is a light manufacturing plant. It brings to education the methods of industry: division of labor, economies of scale, consistency of quality, uniformity of distribution. This, of course, is the primary attraction of distance education for developing countries. Industrial production tech-

niques can make quality education available at a fraction of the cost of conventional methods. Hundreds of thousands of students are now enrolled in distance education programs in countries such as China, Korea, Thailand, and India because the resources to expand the conventional system to provide education of comparable quality to such numbers were simply not there. It is appropriate that newly industrializing economies should also apply industrial methods in education.

Although the countries mentioned above all have large populations, distance education can also yield economies for small countries. They must, however, approach the industrialization of education much as they approach industrialization in other sectors. This means flexible manufacturing processes, more emphasis on local assembly (and less on vertical integration), development of regional markets, and international partnerships. Fortunately, current world conditions are now favorable to all these requirements. The revolutions in word-processing, printing, and video production make it easy to customize teaching materials for short production runs. An international "exchange and mart" in course materials is at last developing through bodies such as the Commonwealth of Learning, which also facilitate multilateral regional co-operation in distance education.

The logistics of consumption in distance education present another dynamic. The analogy with an insurance company is appropriate because it is a service industry. The head office produces insurance products and underwrites policies. It must be supported, however, by local offices that tailor policies to customer needs and help customers who make claims against their policies. In the same way, distance education institutions produce teaching materials centrally but support them through a network of staff who counsel and tutor individual students.

The logistics of creating and producing course materials are quite different from those of their distribution and support. The greatest challenge that a distance education project faces is the great variety of functions it has to carry out, because these functions call for an equal variety of organizational styles. Since distance education has been called an industrial form of education, it is sometimes assumed that it must be organized along the mechanistic lines of older manufacturing industries. This is a simplistic view. It is nearer the truth to see distance education institutions as prototypes of the information-based organizations of the twenty-first century.

While running the printing presses and operating a course-materials warehouse may be best done using traditional industrial methods, functions such as the creation of teaching materials by a course team require the most modern forms of project management. Similarly, organizing the information flows necessary to support effective tutoring and counselling is a complex task. Some years ago, Morgan (1986), in his book *Images of Organization*, suggested that a range of metaphors is helpful in understanding organizations (e.g. machine, organism, brain, culture). Nearly all of them are relevant to distance education institutions.

The potential complexity of distance education institutions should not discourage developing countries from adopting distance methods. Rather, it should be an incentive for them to organize the basic logistics of production and consumption in a clear manner. A final insight from the military analogy is the need to avoid "logistic snowball," a phenomenon to which distance education systems can easily fall prone. Logistic snowball is a chain reaction that can occur with both personnel and materials. Before a distance teaching system adds a new element to its instructional approach in response to a perceived problem, it must be sure that the complexity thus added will not trigger a spiral of additions of personnel and equipment that will make the system as a whole less effective than before.

Small developing countries have the advantage of being able to create distance education systems that are both simple and effective. In a small country, the distribution of course materials is likely to be easier than in a large one. It will also be easier to create a network of centres for group work using existing schools. Access to broadcast media with national coverage may be easier, too.

What Kind of Institutional Structure?

Appropriate institutional structures for distance education obviously depend on the size of a country and its communications infrastructure. Neither the Central China TV University, with a student body of over a million, nor the Wisconsin Interactive Communication Systems, with teleconference and telescript facilities in dozens of locations, is a promising model for a small developing country. However, even within individual countries, the institutional structures for distance education have evolved with time. The direction of this evolution, and the reasons for it, are instructive.

In the public/non-profit sector the earliest distance education took the institutional form of correspondence units added to conventional institutions. In Canada, for example, the first such unit was established at Queen's University in 1889. Such units have made a solid contribution over the years, but their own subservient status within larger conventional institutions maintained distance teaching in a peripheral role.,

In an attempt to bring distance methods into the mainstream of education, separate institutions were created in several countries. Some were government correspondence schools at the secondary level (Canada, Australia), some were university-level operations (USSR, South Africa), and others, such as the UK's National Extension College, addressed the further education of adults. The effect of such institutions was to make distance education more widely available and to demonstrate its strengths.

These institutions provided the launchpad for the next

generation of institutions, the open universities that appeared in many countries in the decade following the establishment of the UK Open University in 1969. The open universities brought to distance education the prestige of university-level work, strong political commitments from governments, and the imaginative use of modern electronic media. This combination put distance education on the map. For a while, having an open university was the educational equivalent of a national airline in international status.

Focus on the particular institutional form of an open university temporarily obscured the fact that distance education is simply a powerful addition to the toolkit of approaches available to educators at all levels. The latest generation of institutional structures reflects the realization by governments that many existing educational institutions can adopt distance methods given an appropriate organizational or technological catalyst. These new structures therefore try to make available, to all levels of the education and training system in place, the knowhow and the communications and pedagogical resources that effective distance education requires. Three examples will show the different ways in which this can be done.

In Ontario, the Contact North network makes a teleconferencing facility and some 40 staffed and well-equipped learning centres available to all government agencies and educational institutions serving the region. An associated development fund gives grants to institutions for the preparation of new distance education courses and programs. Contact North has been very successful. The number of those taking advantage of distance education opportunities has risen sharply in the sparsely populated area it serves.

In Britain, the Open College, which began operations in 1987, is a very different type of organization from the Open University. It develops courses and packages, many of a vocational nature, which are then made available through a whole range of public institutions and private businesses to their students and employees. According to our earlier analogy, the Open College organizes the logistics of production but lets others look after the logistics of consumption.

British Columbia has created the Open Learning Agency to co-ordinate distance education in the province. One of its components is the Knowledge network, a satellite network and supporting systems that all existing institutions are encouraged to use.

These institutional models are of special relevance to small developing countries, which may have a substantial investment in existing institutions and be reluctant to create a grand new structure. One example is Mauritius, a country that already has an impressive capacity for educational intervention that could be brought together in consortia to carry out distance education projects (Daniel, 1989).

However, a word of caution that applies to all institutional structures for distance education is in order. Implementing distance education through these new facilitating structures or consortia requires no less political will than the creation of stand-alone institutions like open universities. Indeed, the new structures may require a more consistent commitment. In stand-alone institutions, the staff themselves push for the success that will ensure the institution's survival. Making existing institutions work together within the newer type of structure may require some unsubtle government pressure until such time as the success of the distance education initiatives become self-evident.

An advantage of these structures is that they facilitate the transfer of distance education courses from one institution to another. In stand-alone distance teaching institutions, the "not-invented-here" syndrome has a tendency to take hold. In consortium-type structures, however, which place a greater emphasis on the delivery of instruction than on the creation of an institution, staff more readily see the advantages of materials produced elsewhere. Thus, after many years of disappointingly low volumes of course-materials transfer between institutions, the long-heralded growth of this form of co-operation may be about to start.

The most striking indicator of this trend is the new Open Learning Institute of Hong Kong. Created by the government of Hong Kong following the success of the privately-run Open College of the University of East Asia, the OLIHK began operations in October 1989 with a curriculum composed entirely of courses from other institutions, notably the British Open University.

As well as being more open to the products of other distance education institutions, consortium structures also facilitate co-operative ventures with traditional institutions. Rumble (1990) suggests that "the amalgamation and re-missioning of distance and appropriate traditional institutions to create new distributed educational services institutions which teach on-campus and off-campus" may be the way of the future. He points out that new technologies, such as computer conferencing systems, make it easier for traditional institutions to offer distance education. They allow such institutions to exploit their main asset, a large and diverse teaching staff, without obliging them to develop the extensive systems required by the logistics of production and consumption for mass distance education.

The notion of flexible institutions that can combine classroom and distance teaching and use materials from around the world is beguiling. But a caveat is in order. A well-engineered structure combines strength and flexibility. Now that distance education institutions have developed their logistic systems to a high level of professionalism, it is easy to forget just how sophisticated they are. Even though we know much more about how to operate mass distance education systems than we did 20 years ago, their creation is still a difficult organization challenge. Consortium approaches will not work unless the processes of producing and supporting distance teaching materials receive the necessary attention.

As awarenc ss of the potential importance of distance education in development has spread through various international organizations, mechanisms for facilitating the introduction of these techniques to developing countries have been set up. The latest example is the Commonwealth of Learning. It merits a brief description in conclusion, since it winds together the two threads of this paper: the needs of the developing world, and the resources of distance education.

The Commonwealth of Learning

In the 1980s, the Commonwealth paid special attention to the needs of the small states that make up the majority of its membership. It also took an increasing interest in the potential for international cooperation in distance education, motivated initially by alarm at the decline in the numbers of students moving between Commonwealth countries to attend university. Governments asked the Commonwealth to explore the potential of distance education to move knowledge, rather than students, between countries.

In 1987, a Commonwealth expert group proposed the creation of a "University of the Commonwealth for Cooperation in Distance" (Commonwealth Secretariat, 1987). In responding to this proposal, governments entered two reservations that reflected trends mentioned in the present paper. First, believing that the major need for distance education in developing countries would likely not be at the university level, they wanted to aim the project at all forms of post-school-age education. Second, in light of the evolution of institutional structures for distance education from stand-alone establishments to consortia and networks, they asked for a more flexible organizational format.

These wishes were taken into account by a planning committee (Commonwealth Secretariat, 1988) whose work formed the basis for the formal establishment of The Commonwealth of Learning September 1, 1988. The aim of the new agency is to help developing countries meet their human-resource development needs by the use of distance education. It does this by providing information on the practice of distance teaching, by strengthening local institutions through staff training and consultancies, and by encouraging the sharing of course materials. It operates out of a small headquarters in Vancouver, but in a real sense the Commonwealth of Learning is—as the name implies—a network of institutions and individuals around the world that work together to increase the contribution of distance education to development. Early indications are that the new agency is a useful multilateral complement to existing bilateral arrangements for co-operation between Commonwealth countries.